

that small instruments have been the means by which a large amount of useful work has been done in this field of observation. It is also an unavoidable conclusion that many of the mistakes in planetary work have been due to inadequate power and light in the appliances used. Possibly during the next few months some of the existing discordances may be cleared up, and some new facts learnt concerning this the most beautiful planet of our system.

There was an interesting occultation of Saturn by the moon on June 13, but at Bristol clouds interfered with observation. At Yeovil, Somerset, the Rev. T. E. R. Phillips watched the phenomenon with a 3-inch refractor. There will occur another event of this kind on September 3 next, when the planet will disappear at 7h. 16m. and reappear at 8h. 11m. p.m. Occultations of Saturn are somewhat rare, the last, prior to that of June 13, occurring twelve years ago, viz. on October 1, 1888.

The planet may now be studied with advantage from southern observatories, where his altitude will be considerable and conduce to that excellent definition which is so necessary for the detection of faint and delicate markings. As every opposition it seems necessary that the number and arrangement of the various belts should be noted. A dark polar cap should be looked for, and any irregular appearances, such as dark and light spots on the dusky belts or intervening zones, should be carefully recorded. It is unfortunate that the results obtained in previous years are not sufficiently accordant to be of much service. In some cases where one observer has drawn one or two belts, another, equally experienced and with more powerful means, has represented seven or eight. Certain observers see the belts and zones mottled with spots, while others describe the aspect as perfectly smooth and quite devoid of all such irregularities. The evidence is, in fact, so conflicting that new and thoroughly trustworthy observations are greatly needed to set at rest the actual character of the details visible on this exceedingly attractive object. W. F. DENNING.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—On April 27, 1899, an anonymous gift of 5000*l.* was made towards the building of a pathological laboratory. The donor now allows his name to be made known, and a decree will consequently be proposed on July 7, that the thanks of the University be conveyed to Ewan Richards Frazer, B.M., Balliol College, for his munificent donation to the pathological laboratory.

CAMBRIDGE.—The annual report of the Cambridge Observatory appears in the *Reporter* for June 30. It includes an account of valuable work done with the Newall telescope, and of the steps taken to bring to perfection the Sheepshanks photographic equatorial. The binary character of a Aurigæ was announced as discovered at the Observatory two days before the arrival of Prof. Campbell's independent publication from the Lick Observatory.

Scholarships, or exhibitions, in natural science have been awarded at the following Colleges thus :

Peterhouse : Lee.

Gonville and Caius : Cleminson, Burne, Garnsey, Lock, Macfie, Rittenberg, Thornton.

The Hopkins Prize for the period 1894-97 has been awarded to Mr. J. Larmor, F.R.S., of St. John's College, for his investigations on the Physics of the Aether and other valuable contributions to mathematical physics.

Mr. William Ritchie Sorley, formerly Fellow of Trinity College, has been chosen Knightsbridge Professor of Moral Philosophy in the place of Dr. Henry Sidgwick, who has resigned in consequence of ill health.

PROF. SIMON NEWCOMB has had the degree of doctor of laws conferred upon him by the University of Toronto.

PROF. J. H. POYNTING, F.R.S., has been elected Dean of the Faculty of Science of the University of Birmingham.

THE honour of knighthood has been bestowed upon Dr. G. Hare Philipson, president of the University of Durham College of Medicine, Newcastle-upon-Tyne.

PROF. J. R. CAMPBELL, head of the Agricultural Department of Yorkshire College, has been appointed under-secretary to the Department of Agriculture and Technical Instruction for Ireland.

THE honorary degree of D.Sc. has been conferred by the University of Oxford upon Prof. J. Mark Baldwin, of Princeton University, New Jersey, U.S.A. The new doctor is professor of psychology at Princeton, and editor of the *Psychological Review*.

HONORARY degrees were on Saturday last conferred by the Victoria University upon Lord Rayleigh, Sir William Huggins, Sir W. C. Roberts-Austen, Sir William Abney, Dr. T. E. Thorpe, Prof. J. Dewar, Prof. A. R. Forsyth, Mr. R. T. Glazebrook, Prof. Pickering, Prof. J. J. Thomson, and Mr. Henry Wilde.

A GRANT of 58*l.* from the Earl of Moray Endowment has been made by the Edinburgh University Court to Dr. J. H. Milroy for purposes of research. At a recent meeting of the Court it was announced that the late Prof. Sir D. MacLagan had bequeathed a marble bust of himself to the University, and that Miss E. A. Ormerod had presented six large volumes of drawings, chiefly by her father, to the library.

THE Drapers' Company offer for competition eight scholarships tenable at the day classes of the East London Technical College in chemistry, physics and engineering. The scholarships are of the value of 25*l.*, 10*l.* being paid during the first year and 15*l.* during the second year. They also carry with them free tuition. Particulars may be obtained from the Director of Studies, East London Technical College, People's Palace, E.

THE annual meeting terminating the session of the department of engineering in connection with University College, Liverpool, took place on Thursday last, when the William Rathbone Medal and the Rathbone Prizes were distributed by the Lord Mayor of Liverpool. The report, which was of a highly satisfactory character, was read by Prof. Hele-Shaw, after which an address was delivered by Prof. John Perry, F.R.S., upon the value of a thorough scientific education to the engineer.

THE following is a list of the members of the new Board of Education Consultative Committee :—Rt. Hon. Arthur Herbert Dyke Acland, Sir William Reynell Anson, Bart., M.P., Prof. Henry Armstrong, Mrs. Sophie Bryant, Rt. Hon. Sir William Hart Dyke, Bart., M.P., Sir Michael Foster, K.C.B., M.P., Mr. James Gow, Litt.D., Mr. Ernest Gray, M.P., Mr. Henry Hobhouse, M.P., Mr. Arthur Charles Humphreys-Owen, M.P., Sir Richard Claverhouse Jebb, M.P., Hon. and Rev. Edward Lyttelton, Very Rev. Edward Craigh Maclure, D.D., Dean of Manchester, Miss Lydia Manley, the Venerable Ernest Grey Sandford, Archdeacon of Exeter, Mrs. Eleanor Mildred Sidgwick, Prof. Bertram Coghill Alan Windle, M.D., Rev. David James Waller, D.D. The draft Order in Council, giving particulars of the duties, &c., of the Committee, has been issued as a Parliamentary paper.

FURTHER munificent gifts for the furtherance of education in the United States are announced in *Science* and are as follows:—The sum of 125,000 dollars has been left to Harvard University by the late Edmund Dwight. The bequest will come into the hands of the University authorities after the death of certain persons who receive the income during their lifetime. The amount (100,000 dollars) promised by Mr. Rockefeller to Denison University, on condition that 150,000 dollars additional be raised before July, has now been claimed, the sum named having been subscribed. The sum of 50,000 dollars has been given to Colorado College by Mr. W. S. Stratton; Mr. M. K. Jesup has given 25,000 dollars to Princeton University, and Lombard College in Galesburg, Ill., benefits in a like degree by the gift of Mr. W. G. Waterman; while 10,000 dollars have been subscribed by Messrs. Phelps, Dodge and Co. for the endowment of the department of mining and metallurgy at Columbia University. In addition to the foregoing it is announced that Mr. L. C. Smith will build and equip a civil engineering building in connection with Syracuse University.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, June 14.—“The Nature and Origin of the Poison of *Lotus Arabicus*.” By Wyndham R. Dunstan, F.R.S., Sec.C.S., Director of the Scientific Department of the Imperial Institute, and T. A. Henry, B.Sc.Lond.

Lotus Arabicus is a small leguminous plant resembling a vetch, indigenous to Egypt and Northern Africa. It grows abundantly in Nubia, and is especially noticeable in the bed of the Nile from

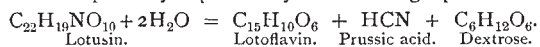
Luxor to Wady Halfa. It is known to the natives as "Khuther," and old plants with ripe seed are used as fodder. The dried plant is unusually green, and possesses the aroma of new-mown hay. At certain stages of its growth it is highly poisonous to horses, sheep and goats, the poisonous property being most marked in the young plant up to the period of seeding. Owing to the trouble which this plant has given to the military and civil authorities in Egypt, the assistance of the Director of Kew was sought in order that the precise nature of the poison might be ascertained, and, if possible, a remedy found. The matter having been referred to the Scientific Department of the Imperial Institute, Mr. E. A. Floyer, Director of Egyptian Telegraphs, collected some of the material for investigation.

It was found that when moistened with water and crushed, the leaves of the plant evolved prussic acid in considerable quantity, the amount being greatest in the plant just before and least just after the flowering period. Further investigation has shown that the prussic acid originates with a yellow crystalline glucoside ($C_{22}H_{19}NO_{10}$), which it is proposed to name *lotusin*. Under the influence of an enzyme, also contained in the plant, lotusin is rapidly hydrolysed, forming *prussic acid*, *sugar*, and a new yellow colouring matter (*lotoflavin*). The hydrolysis may be effected by dilute acids, but is only very slowly brought about by emulsin and not at all by diastase. The peculiar enzyme, which it is proposed to call *lotase*, appears to be distinct from the enzymes already known. Its activity is rapidly abolished by contact with alcohol, and it has only a feeble action on amygdalin. Old plants are found to contain lotase but no lotusin.

The *sugar* has been proved to be identical with ordinary dextrose.

Lotoflavin, the yellow colouring matter, has the composition expressed by the formula $C_{15}H_{10}O_6$. It belongs to the class of phenylated pheno- γ -pyrones, and is a dihydroxychrysin, isomeric with luteolin, the yellow colouring matter of *Reseda luteola*, and with fisetin the yellow colouring matter of *Rhus cotinus*.

The decomposition which ensues on bringing lotase in contact with lotusin, as happens when the plant is crushed with water, is therefore probably expressed by the following equation:—



Hydrocyanic (prussic) acid occurs in small quantities in many plants, and according to Treub and Greshof is often present in the free state. The only glucoside at present definitely known which furnishes this acid is the well-known amygdalin of bitter almonds, which under the influence of the enzyme emulsin, also contained in the almond, breaks up into dextrose, benzaldehyde and prussic acid.

Owing to the scientific interest which attaches to this new glucoside, its properties and those of its decomposition products have been very fully studied, and the characteristics of the new enzyme have also been investigated.

We are much indebted to Mr. Floyer for the great pains he has taken to collect, in Nubia, the necessary material for this investigation, and also to Sir W. T. Thiselton-Dyer for having grown the plant at Kew from seed obtained from Egypt.

"The Exact Histological Localisation of the Visual Area of the Human Cerebral Cortex." By Joseph Shaw Bolton, B.Sc., M.D., B.S. (Lond.).

Geological Society, June 6.—J. J. H. Teall, F.R.S., President, in the chair.—Mechanically-formed limestones from Junagadh and other localities, by Dr. J. W. Evans. After reviewing the conditions under which granular limestones may be accumulated by current- or wind-action, the author proceeds to describe the limestone of Junagadh, a deposit some 200 feet thick, resembling in hand-specimens the Oolites of this country, though less firmly cemented together. The deposit is situated at a distance of thirty miles from the sea, and contains no large fossils of any kind. Calcareous rocks of similar character are described from other parts of Kathiawad, Kach, the south-eastern coast of Arabia, and the Persian Gulf—some of these contain unbroken marine shells and other fossils. These beds are included by Dr. H. J. Carter under the name of miliolite, on account of the frequent presence in them of the genus *Miliola*. The author discusses the origin of these deposits, and comes to the conclusion that the grains were formed in sea-water saturated with carbonate of lime: some being deposited by currents in shallow water, and others thrown up as a calcareous beach, from which a portion were sifted out by the wind and blown inland

to form æolian deposits.—Note on the consolidated æolian sands of Kathiawad, by Frederick Chapman. The name miliolite-formation was originally given by Dr. H. J. Carter to certain granular calcareous deposits occurring on the coast-line between the peninsula of India and the mouth of the Indus. The foraminifera and other organic remains in the rocks must have inhabited moderately shallow to littoral marine areas. The minute granules are worn and polished; the prevailing genera of foraminifera are roundish, and would be easily moved by wind; remains of larger organisms are absent; and the deposits are false-bedded. All these phenomena are explicable if the deposits represent the accumulation of material derived from littoral calcareous sand of marine origin, mixed with mineral detritus from adjacent hills.—On Ceylon rocks and graphite, by A. K. Coomara Swamy. Ceylon is surrounded by raised beaches, and has been elevated in recent geological times; fluviatile deposits also occur: the gems for which Ceylon is famous are obtained from gravels in the Ratnapura district. With the exception of these recent deposits, the island probably consists entirely of ancient crystalline rocks. Graphite occurs chiefly in branching veins in igneous rocks, which at Ragedara are granulites and pyroxene-granulites. The relations to the matrix are described, and are held to favour the idea of the deposition of the mineral as a sublimation-product (Walther), or from the decomposition of liquid hydrocarbons (Diersche). Analysis of several of the minerals, including manganhedenbergite, are given; and a bibliography of the geology of the island is appended.

Mineralogical Society, June 19.—Prof. N. S. Maskelyne, F.R.S., Past-President, in the chair.—Prof. H. A. Miers presented a communication from Miss Agnes Kelly on conchite, a new form of calcium carbonate. Conchite forms the material of various calcareous secretions in the animal kingdom (more particularly molluscan shells) which have hitherto been referred to aragonite; it also occurs as the fur in kettles and boilers, and in many concretionary deposits, such as those of Karlsbad. In most of its characters it is intermediate between calcite and aragonite; like calcite it is uniaxial negative, but shows no cleavage or twinning, and has higher indices of refraction; and like aragonite it is converted into calcite on heating, but the change takes place at a lower temperature.—Mr. G. F. Herbert Smith described a method for the determination of the three principal indices of refraction from observations made in any arbitrary zone. This method is intended for minerals of low symmetry of which the indices are higher than those of any liquid. Observations are made of the deviations corresponding to different angles of incidence on both faces of a prism, and curves connecting the indices and the angles of orientation are plotted out. As in the method of total reflection, three of the critical values give the principal indices.—Mr. H. L. Bowman described the occurrence of monazite at Tintagel, and gave a detailed account of the crystallographic characters of the associated minerals, albite, quartz, rutile, pyrites and calcite.—Dr. J. W. Evans discussed the alteration of pyrites by underground water, a question which had arisen in connection with the erection of a dam in Mysore. From his experiments the author concludes that, provided the water contain a sufficient amount of carbonate of lime to neutralise the sulphuric acid resulting from the oxidation of the pyrites, exact pseudomorphs of limonite after pyrites are formed; and as these occupy practically the same volume as the original pyrites, the rock suffers little disintegration by the action of the water.—Petrological notes by Mr. G. T. Prior dealt with the so-called "cancrinite-ægryrine-syenite" of Elfdalen, which he refers to *sussexite* at the basic end of the *grorudite-tinguaitite* series of Brögger; with a *riebeckite-ægryrine-tinguaitite* (so-called "proterobase") from the Rupbachthal; and with *melliite-basalts* from Madagascar and Siam.—Mr. L. Fletcher discussed the quantitative determination of the action of hydrochloric acid and of soda-solution on the enstatite and feldspar of the Mount Zomba meteorite.

CAMBRIDGE.

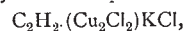
Philosophical Society, May 21.—Mr. J. Lamor, President, in the chair.—On a certain diophantine inequality, by Major MacMahon, R.A., F.R.S.—On rational space curves of the fourth order, by Mr. Richmond.—On the reduction of quadrics, by Mr. Bromwich.—Experiments upon the rise of temperature of fabrics when moistened, by Dr. L. Cobbett. Dr. Cobbett showed that if expired air is breathed through several layers of dried filter paper wrapped round the bulb of a thermometer, a temperature

of 10° C. or more above that of the body may be registered (Dr. Dudgeon's experiment); and that if a roll of flannel, thoroughly dried, be warmed to 96° C. and put into saturated steam at 100° C., the temperature within the roll may rise 30° C. or more above that of the steam (Dr. Parson's experiment). Further, he showed that when a roll of flannel, which has not been artificially dried is put into steam, at atmospheric pressure, heated to 200° C., though the surface of the roll becomes charred, the temperature in its interior rises rapidly to 100° C., but does not exceed this for a long time—indeed, not until all the separable water has been boiled away. He concluded that such substances when quite dry have the property of uniting with water, and of generating heat in the process, and this without becoming damp in the ordinary sense of the word; and maintained that the source of this heat is not alone the latent heat of the vapour condensed, because a rise of temperature takes place when dried filter paper is wetted with water at the same temperature, but must include also either the latent heat of water converted into the solid state—as Sir W. Roberts has suggested in discussing Dr. Dudgeon's experiment—or else the energy set free in a chemical combination between the material and the water.—Experiments upon striated discharges, by R. S. Willows. The conditions affecting the distance between the striæ were investigated for hydrogen, nitrogen and air. In the first gas, as the current was increased from a very small value, the striæ first separated, attained a maximum distance of separation, and finally approached each other. In nitrogen and air their distance apart at first increased, and finally became constant. The distance apart varies inversely as the pressure until the discharge reaches the walls of the tube. The effect of the nature of the gas, the diameter and length of the tube, and the shape of the electrodes was also investigated. Any variation due to these was found to obey no simple law. The double striæ in hydrogen, noticed by De la Rue and Müller, were found to constitute a normal part of the discharge in this gas, provided a suitable pressure were established.—A method of measuring the retardation produced by a crystal plate, by L. R. Wilberforce. The author described a ready way of approximately determining the retardation produced by a plate of biaxial crystal cut perpendicularly to a mean line. The requisite measurements could be made with an ordinary polariscope.

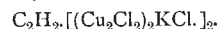
PARIS.

Academy of Sciences, June 25.—M. Maurice Lévy in the chair.—Problem of the cooling of a wall by radiation, reduced to the simpler case of cooling by contact, by M. J. Boussinesq.—Note on a series of abnormal contacts in the western region of the lower Pyrenees, by MM. Michel-Lévy and Léon Bertrand.—M. Giard was elected a member of the Section of Anatomy and Zoology in the place of the late M. Milne-Edwards, and M. Bazin was elected correspondent for the Section of Mechanics.—On the large sun-spot observed on June 17 with the great telescope of 1900, by M. Moreux. This sun spot, a drawing of which accompanies the note, had a diameter of 36,000 kilometres, and furnished a good example of the mechanism of segmentation of a sun spot. According to the author's hypothesis, the phenomena are not due to cyclones or volcanoes, but to superheated regions.—Trigonal normal curves, by M. F. Amodeo.—On the motion of a wire in space, by M. G. Floquet.—On two remarkable groups of geometrical loci, by M. E. Mathias. In his experimental results obtained with carbonic acid, M. Amatag has considered the case of the locus of points in the (ρ, z) plane, such that for a total weight of liquid and vapour equal to unity, the volume of the liquid is constantly equal to that of the vapour. This locus, according to M. Amatag, is a straight line, nearly perpendicular to the axis of abscissæ; but the author now shows that this locus is a curve constantly convex towards the volume axis.—On the discontinuity of the cathodic emission, by M. P. Villard. The three modes of exciting a Crookes' tube are considered, alternating currents, an induction coil and a static machine, and in each the phenomenon would appear to be discontinuous.—On the permeability of fused silica to hydrogen, by M. P. Villard. At 1000° fused quartz resembles platinum, in allowing hydrogen to pass through.—On the resistance of fused silica to sudden variations of temperature, by M. Dufour.—On the telegraph, by M. Valdemar Poulsen. A description of an instrument for automatically recording words spoken through a telephone.—On the development and propagation of the explosive wave, by M. H. Le Chatelier. An application of the photographic method to the

study of the explosive wave. Measurements are given for various mixtures of acetylene and oxygen, acetylene and nitric oxide, acetylene and nitrous oxide, and carbon monoxide and oxygen. In the last case the velocities depend upon the mode of ignition, and upon the quantity of the fulminating substance used to start the explosive wave.—On the acidity of the alcohols, by M. de Forcrand. A thermochemical paper.—Addition of hydrogen to ethylene in presence of various reduced metals, by MM. Paul Sabatier and T. B. Senderens. Reduced cobalt effects the combination of ethylene and hydrogen at ordinary temperatures similarly to reduced nickel. A comparison of the results obtained with reduced nickel, cobalt, copper and iron shows that the activity of the metals in causing this reaction is in the order given, nickel being the most energetic.—On the crystalline combinations of acetylene with cuprous chloride and potassium chloride, by M. Chavastilon. It has been previously shown by the author that two kinds of crystals, yellow and colourless, may be obtained from the same copper solution, according to the velocity of the current of acetylene. Further analyses show that the colourless crystals correspond to the formula



and the yellow crystals,



By the action of ether upon the colourless compound, the yellow crystals are obtained.—Oxidation of anethol and analogous substances containing a lateral propenylic chain, by M. J. Bougault. The method of oxidation used is the action of iodine in presence of precipitated mercuric oxide, an aldehyde being obtained. Aldehydes from anethol, isosafrol, isomethyleugenol and isopiol have been prepared, together with the corresponding acids.—On a new derivative of benzophenone, by MM. Echsner de Coninck and Derrien.—Composition of the compounds of fuchsine with acid colouring matters, by M. A. Seyewetz.—On the kidney of *Lepadogaster Gouaniï*, by M. Frédéric Guitel.—On a fayalite rock, by M. A. Lacroix. The fayalite of Callobrières presents a very remarkable and exceptional mineralogical composition. It is essentially characterised by the association of the fayalite with grünerite, apatite and magnetite.—The function of the cell nucleus in absorption, by M. Henri Stassano. The nucleus, by reason of its chemical composition, plays a predominating part in the absorption of foreign substances.—On the proteolytic diastase of malt, by MM. A. Fernbach and L. Hubert.—Action of high frequency currents upon the elementary respiration, by M. Tripet. In diseases of nutrition, treatment by high frequency currents regulates the activity of reduction of the oxyhæmoglobin.—Influence of extracts of the ovaries upon the modifications of nutrition caused by pregnancy, by MM. Charrin and Guillemonat.—The lake of Ladoga from the thermal point of view, by M. Jules de Schokalsky.—On a balloon ascent made on June 17, by M. Genty.—On an extraordinary halo observed on June 22, by M. Joseph Jaubert.

CONTENTS.

	PAGE
Protoplasm. By Prof. H. Marshall Ward, F.R.S.	217
Pitmanese Phonetics	220
Our Book Shelf:—	
Schulze: "Psychologie der Naturvölker."—H. W. B.	220
Pycraft: "The Study of Bird-Life."—R. L.	221
Taylor: "An Introduction to the Differential and Integral Calculus and Differential Equations"	221
England's Neglect of Science. By Prof. John Perry, F.R.S.	221
Human Babies: What they Teach. (<i>Illustrated.</i>) By S. S. Buckman	226
Notes	228
Our Astronomical Column:—	
Ephemeris for Observations of Eros	233
Measures of Eros	233
Total Eclipse of the Sun, May 28	233
The Royal Observatory, Greenwich	233
The Geological Age of the Earth	235
Notes on Saturn and his Markings. By W. F. Denning	237
University and Educational Intelligence	238
Societies and Academies	238